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tions to the members at some future time, but at present wished only to direct their attention to a portion of a trunk of *Yucca alafolia*, which he exhibited, the structure of which he suggested could not be accounted for on any theory generally known. The general idea was that the sap of plants ascended through the system, and was *elaborated* in the leaves, where the woody matter was formed, and afterwards *descended*,—in exogenous plants forming a regular concentric layer over the last year's wood, and in endogenous structures returning by the interior, pushing these descending columns of wood through the mass of cellular matter without order or system.

It would be seen that in this endogenous *Yucca* the woody matter, if it ever *descended* at all, as our present belief demanded it should do, had descended in a very regular and beautiful manner, quite as systematic, in fact, as most exogens would do. The wood was arranged in annual rings, not entirely concentric; but some tropical exogens did not have the woody annual layers always forming an entire circle any more than in this. In this case the annual layers of wood extended about two-thirds of the distance round the axis, and such layer was about the eighth of an inch thick. These annual layers were made visible by the bundles of fibres being packed more closely together towards the end of the season's growth, just as they are in exogens, from which, indeed, there was very little to distinguish this structure on a cursory examination but the absence of the so-called medullary rays.

March 29th.

The President, DR. RUSCHENBERGER, in the Chair.

Thirty members present.

A resolution to amend Art. XI, Chapter 10 of the By-Laws by the omission of the word "gratuitous," was adopted after a third reading.

The following gentlemen were elected members:

Geo. Hewston, W. H. Eisenbrey and Alfred Tucker.

On favorable report of the committees the following papers were ordered to be published:

Cross fertilization and the law of sex in EUPHORBIA.

BY THOMAS MEEHAN.

Mr. Charles Darwin's interesting observations on cross fertilization have opened a new world for original discovery. The list of plants which seem to avoid self fertilization is already very large. I think *Euphorbia* may be added to the number. Certainly this is the case with *Euphorbia fulgens*, Karw. (*E. jacquinaeflora*, Hook.) which I have watched very closely in my greenhouse this winter. Several days before the stamens burst through the involucre, which closely invests them, the pistil with its ovary on the long pedicel has protruded itself beyond, exposed its stigmatic surfaces, and received the pollen from the neighboring flowers. The way in which the pollen scatters itself is curious. In most flowers a slight jar or a breath of wind will waft the pollen to the stigmas, but I have not been able to notice any to leave the flowers in this way; for as soon as the anther cells burst the whole stamen falls from its filament like pedicel and either drops at once on the pistils of other flowers or scatters its pollen grains by the force of the fall.

This *Euphorbia* also furnishes another contribution to the theory of sex which I have advanced. The plan on which the male and female organs are formed is evidently a common one; and the only reason why some flower

[March,

heads have a pistil in the center, and others are wholly staminate, is, that there is *greater axial vigor when the female flower is formed*. Whenever the common peduncle (below the scarlet involucre) is weak, a pistil never appears in that head of flowers. A few which seem strong neither have them, but the great majority of the strong peduncles are those which bear the female blossoms. Another interesting fact is that the number of male flowers is less in those heads which also bear a female, than in those which are wholly staminate. This seems to add to the point I made in my paper on *Ambrosia*, that after the flowers have been partially formed in embryo, and before the sex has been finally determined, the female flower, being primordially the stronger, has the power of absorbing the males or their partially formed elements into its system. It is certainly remarkable that in both these instances the number of male flowers should decrease in proportion to the existence or vigor of the central female one.

The male and female flowers of *Euphorbia fulgens* are formed much alike. The female occupies the center, and seems really but a prolongation of the main stem, on the top of which is an articulation from which the ovarium springs. The capsula readily falls from this articulation when mature. From the base of the female central peduncle spring weaker peduncles, colorless, appearing indeed almost like filaments, articulated at about the same height as the female, only above the point bearing a short filament and anther—the caduceous part before referred to. No one can fail to see the correspondence of plan in these different parts, and I think that nothing but the favorable position in the direct line of axial vigor made the central flower a female one.

Cases occasionally occur in which a tolerably strong head of wholly male flowers will develop the central axis into a pedicel *almost as long and vigorous as those which bear female flowers*. But the flow of vital force—if I am correct in using this term—not being quite sufficient, the final goal of natural perfection in the female form was not reached. These cases do not occur often, but are well worth looking for, as they show so clearly the dividing line between the forces which govern the male or female sex.

Note on the Relations of SYNOCLADIA, King, 1849, to the Proposed Genus SEPTOPORA, Prout, 1858.*

BY F. B. MEEK AND A. H. WORTHEN,

Of the Illinois State Geological Survey.

Not having studied the *Polyzoa* of our rocks, it was only recently that we noticed the remarkable agreement between the fossil from the Chester division of the Lower Carboniferous, on which Dr. Prout proposed to found a genus *Septopora*, and the common Western Coal-measure species, that has been by some referred to the European Permian species, *Synocladia virgulacea*, the type of Prof. King's genus *Synocladia*. In identifying this fossil, from beds in Kansas referred by him to the lower Permian, with *S. virgulacea*, Prof. Swallow noticed that it differs from the foreign species in having only two, or, on some parts, apparently three,† rows of cellules to each of the longitudinal branches, instead of from three to five rows, as in the latter; and although he referred the Western species doubtfully to *S. virgulacea*, he proposed for it the provisional name, *S. biserialis*, in case the differences noted should be considered of specific importance.‡ Prof. Geinitz, however, did not consider these differences of full specific value, and referred the species to *S. virgulacea*.§

* Transac. Acad. Sci. St. Louis, Vol. I, p. 446, pl. 18, fig. 2, 2 a, b, c, 1858.

† It is only *immediately* below the bifurcations of the larger stems that the pores are so arranged that they might be counted so as to appear to make three rows, the proper number of rows being only two.

‡ Trans. Acad. St. Louis, Vol. I, p. 179, 1858.

§ Carbonif. und Dyas, in Nebraska, p. 70, 1866.